

**Department Chemistry, University of Kerala, Kariavattom,  
Thiruvananthapuram, Kerala, India – 695 581**

08/10/2020

**E-Tender Notice (Re-tender)**

Department of Chemistry, University of Kerala, Kariavattom invites open tenders through e-Procurement (in two bid system), from reputed manufacturers/authorized distributors/Indian Agents for the purchase of the equipment ‘Time Correlated Single Photon Counting (TCSPC) Lifetime Fluorescence Spectrophotometer with Microscope Facility’ in the Department, in connection with the implementation of the Specific Project "Advanced Research Laboratory for Molecular Sensing and imaging”.

Last date and time for submission of tender online	<b>22/10/2020: 5 PM</b>
Date and time of opening of Technical bid	<b>28/10/2020: 11AM</b>
Date and time of opening of Financial bid	After technical Evaluation.
For technical details contact	Dr. Sony George Assistant Professor and Head Department of Chemistry Mobile : +91-9446462933 Email : emailtosony@gmail.com

## TECHNICAL SPECIFICATIONS

### **Modular Steady state and Time Resolved Fluorescence Spectrometer with Imaging Facility.**

High Performance Hybrid Fluorescence/Phosphorescence Lifetime and Steady State Spectrometers fully automated system with modular and flexible design- Integrated with a Fluorescence Microscope for Imaging.

Enable Photochemistry experiment such as Steady-State Fluorescence Spectroscopy, Time-Resolved Fluorescence, Measurement, Singlet oxygen determination, Time Resolved Photoluminescence (TRPL), Lanthanide Up conversion, Fluorescence Anisotropy (Polarization), Electro luminescence, Characterization of LEDs,

Having the following modes of operation:

- Measurements of steady state excitation and emission spectra
- Life time measurements (TCSPC)
- Phosphorescence capability (MCS) / flash lamp
- Microscopic Fluorescence Spectroscopy

Fluorescence Spectrometer having NIR (up to 1550 nm) for time-domain lifetime measurements, incorporates TCSPC (time correlated single photon counting), with true single-photon sensitivity, with multiple sources as options, including Pulsed Diode Laser and LED sources, and pulsed lamps for wideband pulsed light. Coupled to a Fluorescence **Upright microscope or Inverted Microscope**

#### **Detailed Specification**

1. Modular Research Fluorescence Spectrometer with 300W ozone free Xenon source **or better** for steady state Fluorescence measurement and power supply. Another 10 W ozone free Xenon flash lamp **or better** for Phosphorescence measurements.
2. **Excitation Channel - Double Monochromator**  
**High resolution excitation double monochromator**  
A double grating Czerny-Turner excitation or with better design with 1200 g/mm gratings blazed at 300 nm or better. It is mandatory to quote double grating spectrometer in the excitation side so as to provide stray light rejection of 1:10<sup>8</sup> or better at excitation side.
3. Filter slots for suppressing higher orders
4. **Emission Channels High resolution emission monochromator**  
Czerny-Turner spectrometer or better design with 1200 g/mm blazed at 500-550 nm for measuring emission up to 850nm **or more** should be offered
5. **Detectors and Other Standard Components**

- a) The System should have continuously adjustable entrance and exit slits operated under computer control, with all reflective optics, photodiode reference detector, and excitation shutter, photon counting electronics and controlling software.
- b) **Two detectors-** (i)PMT/ Hybrid PMT- 250-850nm emission detector for both steady-state and time-resolved measurements and (ii) Suitable NIR Detector (950 nm to 1550 nm or better)forSteady state measurement
- c) Solid sample holder. Designed for viewing front face fluorescence of thin films, powders, pellets, paper, fibers, or microscopic slides with variable alignment angle and right-angle detection instantly should also be offered.
- d) 4 numbers of **4mL** liquid quartz cuvette and 2 numbers of **500µL cuvette**.
- e) Suitable order sorting filters in the range of 370nm, 399nm, 450nm, 500nm and 550nm along with holders should be offered.
- f) Necessary items for NIR fluorescence measurements up to 1550nm or better in T channel/**or suitable** configuration enabling attachment of Integrating Sphere for quantum yield measurements with necessary holders for powder, thin films and liquid should be offered.
- g) Signal to noise ratio: >29,000:1 RMS (>14,000:1 FSD)
- h) Wavelength Accuracy: minimum +/- **0.5 nm** or better
- i) Temperature dependent (LN 2 Cryostat) luminescence measurement: The system should be equipped with all accessories for the temperature dependent PI measurement from 77 K to 500 K for solid and liquid samples with temperature stability  $\pm 0.1$  K and **Turbo pump for temperature controller maintenance pump**.
- j) Sample cell for Cryostat,
- k) **Two numbers of spare ozone free Xenon source which will be used for steady state fluorescence measurements. The vendor has to provide two numbers of spare ozone free Xenon Lamp which will quoted along with system. The power of the lamp should be equivalent to the ozone free Xenon source quoted by the vendor along with the system**

## 6. Integrating sphere and Accessories for **precise** Quantum yield measurements

## 7. **Fluorescent Microscope with Monochrome OR Color camera Attachment For Wide-field and Single point Measurements**

- (a) The Spectrometer should be supplied with an **Upright or Inverted Fluorescence microscope**.
- (b) **The quoted fluorescence microscope should be coupled to the spectrophotometer using appropriate connector system for flawless operations. Sufficient accessories for the integration of the microscope to the Spectrometer should be quoted.**
- (c) Imaging cameras should be supplied to capture and record the images **from Visible region/ NIR (300- 1000 nm or Better) including Up conversion Luminescence**
- (d) Should achieve a spot size of **~2 µm minimum or better with 100x objective** Lens and NIR objective - enabling to record and measure wide-field fluorescence, as well as **to measure fluorescence data from specific spots on mounted sample**. Should ensure the following measurement possible:**Intensity map, Spectral map**
- (e) Optical switch for signal transfer to emission fiber or monochrome camera
- (f) Camera coupling port and monochrome camera
- (g) Requisite range of **fibre bundle/ or liquid light guides**, for communicating between microscope and spectrophotometer spanning in the 370 – 1700 nm wavelength range or Better should be provided .

- (h) NIR transmission objectives, reflective objectives, Excitation and Emission coupling should be provided enabling to capture of excitation scans and phosphorescent and fluorescence lifetime through MCS or TCSPC
- (i) Excitation should be channelized from Xenon Lamp, halogen lamps (wide field excitation), picoseconds pulsed diode lasers and pulsed LEDs, or other suitable Powerful Laser Heads from the spectrometer for Steady state emission spectra, fluorescence and phosphorescence life time measurement from specific spots on mounted sample.
- (j) Tuning of excitation light (illumination) and the detected emission, should be flexible for customized experiments
- (k) Beam splitter part with dichroic beam splitter unit and appropriate dichroic mirrors should be provided
- (l) **XYZ Scanner-and associated data analysis software package.**

## **8. Time Correlated Single Photon Counting (TCSPC) Unit**

- a) Time correlated Single Photon Counting (TCSPC) upgrade for fluorescence lifetime measurement with complete timing electronics should be quoted with the system.
- b) Nano/Pico second LED sources with peak wavelength of 260 nm +/- 10nm(Pulsed width < 1000 ps), 270nm+/- 10nm(Pulsed width < 1000 ps), 300nm+/- 10nm(Pulsed width < 1000 ps), 360nm+/- 10nm(Pulsed width < 1000 ps) and 380 nm or 390 nm+/- 10nm (Pulsed width < 1000 ps) should be offered towards excitation sources.
- c) 375 +/- 10 nm, 440+/- 10 nm, 485+/- 10 nm, 532 +/- 10 nm, 640+/- 10 nm, 766+/- 10 picosecond pulsed diode laser.(Pulsed width < 100 ps for each lasers)
- d) 980 nm laser source of sufficient power **adaptable for Up conversion studies.**
- e) Suitable mounting to attach the excitation sources with the instrument should also be offered.

## **9. Engineering and Electronics Accessories for Electroluminescence (EL) measurement**

- (a) Function Generator. Minimum pulse width <16 ns or Better, suitable for MCS lifetime measurements of electroluminescence (EL) from 100 ns or Better
- (b) Sweeping Electrical output- Amplitude 10 mV – 10 V, DC offset ± 5 V

10. Computer with Software for data collection, analysis and system control should be offered.

11. **The Spectrometer system should Adaptable for Anisotropic Studies. Automated Excitation and Emission Polarizer's for Anisotropy measurements should be provided**

12. Online UPS System with isolation transformer (Power backup of 5 kV with batteries for at least 2h of power backup).

13. Any other items required for the successful installation and successful operation of the system.

14. Another branded desktop computer with software for fluorescence analysis should be offered with at least three years of warranty.

15. A comprehensive warranty for 1 Year + 2year extended comprehensive warranty for all **components including Detectors, Cryostat and Turbo Pump. AMC charges after this period should be quoted.**

16. A detailed compliance statement about your offer with respect to above mentioned tender specification should be enclosed with the technical documents.

17. Suitable Dehumidifier with minimum 15 litre extraction capacity or better for the system should be quoted.

### **Optional Items - should be quoted separately**

(O1) Multiwell plate reader module to perform spectral or time resolved measurements on multi-well plates, with all required accessories should be quoted as optional item

(O2) Advanced Piezo motor driven scanning table of appropriate dimension ensuring a scan area of 50mmX50mm or better for signal scanning with supporting signal synchronizing cable electronics and [Advanced software for FCS, FLCS, FRET, MCS measurement](#)

(O3) [Pulse generator for Electro Luminescence time measurements.](#)

(O4) Synchronizing Electronics required for Life time measurement of Up conversion Samples and Lanthanide Luminescence

### **Terms and Conditions**

1. Every tenderer should submit Tender fee of **Rs. 2,500/-**.
2. Every tenderer should submit Earnest Money Deposit (EMD) of **Rs.1,50,000/-**.
3. The bidder shall have executed "Similar Nature" of single order for an amount not less than Rs.50 lakhs in last three financial years in Government Department/PSU/Autonomous Body or any reputed organization. References order copy along with proof of completion certificate for the project must be provided.
4. Quantities can be increased or decreased by purchaser and bidder has to supply deviated quantities at the rates prescribed and approved by the purchaser in the tender document. Purchase of optional items will be finalized at the time of financial evaluation. However, the bidder must quote the optional items. The bidder should quote all items; partial quote will not be accepted.
5. Original Equipment Manufacturer (OEM) Certificate/ Undertaking. If the bidder is not an OEM, Certificate of authorized dealership/ distributorship from the OEM. A Certificate from the OEM for technical support to the bidder and supply of spares.
6. Incomplete & conditional tenders and tenders received after the due date will be summarily rejected without assigning any reasons thereof.
7. Commercial bids of Short-listed vendors will only be opened. Please note that the Vendor(s) who do not qualify in the technical bid will not be considered for commercial bid.
8. The bidder must not sub-contract the work to other providers.
9. The prices quoted must be on "all-inclusive till destination" basis. The prices quoted should be

inclusive of all Taxes Freight, Packing & Forwarding Charges, Handling, Delivery Charges, installation charges etc.

10. The configuration given is the minimum configuration that is/are required. Vendors may choose to supply higher/better/ enhanced systems/peripherals, but their financial quotes shall be treated as if they have been offered for the specified configuration only.
11. The Bidder shall bear all the costs associated with the preparation of the documents, submission of its bid and we will in no case be responsible or liable for these costs, regardless of the conduct or outcome of the bidding process.
12. The bid shall be typed and shall be signed by the bidder or a person duly authorized to bind the bidder to the contract.
13. The bid shall contain no interlineations erasures or overwriting except as necessary to correct errors made by the Bidder. In such case the person or persons signing the bid shall initial such corrections.
14. The bidder is expected to examine all instructions, forms, terms, condition, and technical specifications in the tender Documents. Failure to furnish all information required by the tender Documents or submission of a bid not substantially responsive may result in the rejection of its bid.
15. The bidders shall give undertaking that all the Components used in the equipment's shall be original make as per the technical specifications submitted and the hardware/software shall be supplied with the authorized license certificates, if found contrary the supplier shall replace the component/equipment with original one at their own cost.
16. Validity of tender: Tender submitted shall remain valid at least for 90 days from the date of opening the tender. Validity beyond three months from the date of opening of the tender shall be by mutual consent.
17. Delivery and installation: Proposed delivery schedule should be mentioned clearly. **Delivery and installation should be made at Department of Chemistry, University of Kerala, Kariavattom campus, Trivandrum without extra cost (inclusive of documentation, demurrage, customs duty, clearance and transportation charges).** University of Kerala will provide customs duty exemption certificates if required.
18. **Complete installation, testing and demonstration of the system and day to-day maintenance are to be provided at site.** The Supply and installation of items must be made within four weeks from the date of issue of supply order. Delay in supply will lead to penalty @1% of the value of tender for every week of delay or part thereof. (i.e. exceeding three days will be calculated as one week). If it is found that the items so supplied are not as per supply order specifications, the

supply made will be rejected and Earnest Money Deposit will be forfeited.

19. Warranty period will start from the date of successful installation of all the items at site.
20. Service facility: Supplier should mention their details of service setup and manpower in Trivandrum who are responsible for after sales support.
21. In case of any dispute, the decision of the University authority shall be final and binding on the bidders. The undersigned reserves the right to reject any or all of the tenders received without assigning any reason thereof.

**Documents to be uploaded:**

1. Signed Compliance Matrix
2. Detailed Technical Brochure
3. BoQ
4. Detailed Financial Bid in pdf format.

Sd/-  
**Registrar**